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Residul Effect of Six Acaricides on the Two-Spotted Spider Mite (*Tetranychus urticae* Koch) (Acari: Tetranychidae) Females on Cucumber under Plastic Houses Conditions in Central Jordan Valley

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ABSTRACT

Laboratory bioassays were conducted during the period from June 2009 to August 2010 to evaluate the residual activities of six acaricides against adult females of four populations of the two-spotted spider mite (*Tetranychus urticae* Koch) (Acari: Tetranychidae). The acaricides included in this study were abamectin, amitraz, bifenazate, chlorfenapyr, milbemectin. Three out of the four tested populations were collected from Krimeh, Deir-Alla and Karamah covering the main areas devoted to cucumber cultivation in central Jordan Valley. The fourth population was brought from Syria and considered as a susceptible strain (SSS).

The toxicity of bifenazate (83%-94%), chlorfenapyr (46%-76%) and spiromesifen (72%-81%) persisted for 9 days against adult mite females when they were applied at the highest recommended field dose. In general average bifenazate induced 89% mortality to all populations, followed by 76% for spiromesifen and 70% for chlorfenapyr. However, abamectin, amitraz and milbemectin did not display residual effect against the local field populations, except tremendous effects against adults females of SSS strain, with residual mortality of 76%, 61%, and 71%, after 9 days, respectively. The results indicated obviously that most of the local TSSM populations displayed different levels, of resistance to abamectin, milbemectin, spiromesifen, amitraz and chlorfenapyr, and were more susceptible to bifenazate.

The results of the study recommend to use acaricides of bifenazate, chlorfenapyr, spiromesifen or any acaricides registered in ministry of agriculture of Jordan in exchange with milbemectin and amitraz to maintain their effectiveness and to avoid or to decrease the possibility of the two-spotted spider mite resistance for these acaricides.

KEYWORDS: Tetranychus Urticae, Acaricdes, Two Spotted Spider-Mite, Residual Effect, Central Jordan Valley, Cucumber, Jordan.

INTRODUCTION

In 2009, the total number of plastic-houses in Jordan, which were planted with vegetables, was about 66,000. More than fifty percent of them were planted with cucumber (36,000). The total production of cucumber in 2009 was about 113,000 tons. Fifty percent of this production was exported to different countries (Ministry of Agriculture, 2009).

The two-spotted spider mite, *Tetranychus urticae* Koch (Acari: Tetranychidae), is a major pest on field crops, plastic-houses crops, horticultural crops, ornamentals and fruit trees (Tsagkarakou *et al*. 1996, Van Den Boom *et al*. 2003, Al-Mommany and Al-Antary 2008). The mite has a very short and prolific life cycle, its resistance to acaricides has more readily emerged than the rate of the resistance in other pests (Zhang 2003). In addition, the mites resistance to certain acaricides has been shown to have cross resistance to other acaricides. Thus, most commercial acaricides have been often proved to be ineffective to control the field mite populations (Ramasubramanian *et al.*, 2005, El Kady *et*

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al., 2007, Koh *et al*., 2009). It is quite possible that TSSM susceptibility to acaricides would differ among cucumber cultivation locations in Jordan.

The Jordanian farmers rely heavily on acaricides to control the two-spotted spider mite. Therefore, they have increased the rate of application, applied a mixture of acaricides and applied acaricides more frequently than they should. They have complained about unsatisfactory results in controlling *T. urticae* (Nazer, 1985). Although TSSM represents a real threat to cucumber plantation under plastic-houses in Jordan, few residual effects studies on this pest have been conducted (Nazer 1982, 1985, Al-Antary *et al*. 2012). The residual effect and resistance of the two-spotted spider mite were reported globally in huge numbers (Goodle *et al.*, Kim *et al*. 2007, Whalon *et al. 2008,* Ghadamyari and Sendi 2008) . Therefore, this study aimed to investigate the residual effects of the six tested acaricides on four different populations of the two spotted spider-mite collected from cucumber under plastic houses in three main regions in the central Jordan valley, in addition to the Syrian susceptible strain.

MATERIALS AND METHODS

Populations of *T. Urticae*

Four *T. urticae* populations of different origin were used in study. Three of these populations were collected from cucumber plants grown under plastic houses conditions in different regions of Jordan. These geographical regions include Krimeh, Deir-Alla and Karamah in central Jordan Valley. These regions are considered the main area for cucumber production in the country. A susceptible strain of *T. urticae* was obtained from Lattakia Center for Rearing and Production of Biological Agents (LCRPBA) in Syria. This strain was reared in (LCRPBA) for 5 years without the application of acaricides at all.

Production of bean plants

Bean (*Phaseolus vulgaris* L. cv. Bronco) was chosen for rearing and for the toxicological tests of the *T.urticae,* because it is one of the mite's favorite host, and for its ease of producing transplants. Seeds of bean (Bronco, Asgrow, USA) were directly sowed inside 10 cm. pots and filled with Peat-moss and Perlite 3:1 ratio.

Plants were infested with SSS *T. urticae* when they reached the true leaf stage. These plants were irrigated and replaced as needed. No pesticides were applied on the plants except for the acaricide tests. These plants were grown under greenhouse conditions in the campus of Faculty of Agriculture at University of Jordan at a temperature of 25-35 ˚c, relative humidity of 45% to 60% and a photoperiod of L16: D8.

Rearing of the Syrian susceptible strain (SSS)

This strain was obtained from Latkia Center for Rearing and Production of Biological Agent (LCRPBA) in Syria. The population was reared in (LCRPBA) for five years without application of acaricides. This Syrian population was brought to Jordan and reared on bean plants inside special insectaria in a separate green houses conditions as above, in University of Jordan, Al-Jubaiha area, starting in June, 2009. Bean plants were irrigated and replaced as needed.

Table (1): The six acaricides and properties which were used to evaluate their residual effect on four populations of the two-spotted spider mite collected from the Central Jordan Valley in 2009

Common name	Trade name	Formulation	Company	Rate of application Mg /L H2O	Molecular formula	Group
Abamectin	Vertimec	1.8 EC	Syngenta AG	7.2	C49H74O14	Abamectin
Amitraz	Mitac	20 EC	Bayer	500	C19H23N3	Amitraz
Bifenezate	Floramite	24 SC	Uniroyal	96	C17H20N2O3	Bifenezate
Chlorenapyr	Pirate	24 SC	BASF	120	C15H11BrCLF3N2O	Chlorenapyr
Milbemectin	Milbecknock	1 EC	Sankyo	12.5	C63H90O14	Abamectin
Spiromesifen	Oberon	24 SC	Bayer	180	C23H30O4	Spinosyns

Tested acaricides

Six of the most common used acaricides for cucumber production in Jordan

were evaluated for residual effects towards *T. urticae*. The acaricides and their properties (Tomlin 2005) are shown in Table (1):

Except abamectin and milbemectin all the used acaricides are of different groups and have different mode of actions (IRAC 2010).

Table (2): Residual effects of six acaricides against *T.urticae* adult females of Krimeh population

Acaricide	Concentration (mg /l)	% Mortality after days (d) or application± SE					
		1d	3d	6d	9d	12d	15d
Abamectin	7.2	22±1.2d	17±1.0c	14±1.2d	11±1.0d	10±1.2d	8±0.0c
Amitraz	500	24±1.6d	18±1.2c	15±1.0d	12±1.6d	9±1.0d	6±1.0c
Bifenazate	96	100±0.0a	99±1.0a	95±1.9a	89±1.9a	75±1.9a	65±1.9a
Chlorfenapyr	120	88±1.6b	78±2.6b	66±1.2c	60±1.6c	54±1.2c	46±1.2b
Millbemectin	12.5	31±1.0c	25±1.0c	17±1.0d	14±1.2d	12±1.6d	9±1.0c
Spiromesifen	180	88±1.6b	82±1.2b	75±1.9b	72±1.6b	61±1.9b	50±1.2b
Control	Tap Water	5±1.0e	3±1.0d	4±0.0e	5±1.0e	5±1.0e	4±0.0d

Means within the same column with the same letter are not significantly different after arcsine transformation using LSD at 0.05

Residual effect of acaricides on *T. urticae* females

The residual effects of different acaricides used on adult females of *T urticae* were evaluated under room temperature conditions. Using a hand sprayer, acaricides were applied on cotyledon leaves of bean at their higher recommended label rates (abamectin 7.2mg/L, amitraz 500 mg/L, bifenazate 96mg/L, chlorfenapyr 120mg/L, milbemectin 12.5 mg/L, and spiromesifen 180mg/L) until run-off. Cotyledon leaves were removed at 1, 3, 6, 9, 12, and 15 days after application. Removed leaves of each treatment were placed in Petri dishes lined with cotton wool (Ochiai *et al*. 2007). Each leaf was infested with 25 adult females of *T. urticae*. The number of dead and alive mites for each treatment was estimated 48 hours after contact with the treated cotyledons, except for spiromesifen the number of alive and dead mites was counted after 96 hours after mite release because it was noticed from the preliminary studies that adult females treated with spiromesifen usually die 96 hours after applying the acaricide. Tab water was sprayed as control.

Statistical analysis

The layout of the residual effect experiment was Complete Randomize Design (CRD) with 7 treatments (one concentration for each acaricide) and 4 replications. Obtained data were subjected to analysis using the SAS programme (SAS, 2002). Prior to analysis, arcsine-transformation of data was done (Little and Hills, 1972). Obtained results from this experiment had been constructed in tables to facilitate comparison. Means were separated using the least significant different at 5% level.

RESULTS

Residual effect of acaricides on *T. urticae* adult females of Krimeh population

Table (2) shows the residual effect of six acaricides when used at their recommended rate against *T. urticae* females collected from Krimeh region. The estimated mortality percentages for abamectin, amitraz and milbemectin were 22%, 24% and 31%,, respectively ,1 day after application. Meanwhile, the induced mortality for these acaricides was 8%, 7% and 9%, respectively, 15 days after application. Mortality percentages for bifenazate 1, 3, 6, 9,12 and 15 days after applications were significantly the greatest compared to other acaricides. On the other hand mortality percentages for abamectin on all days after applications were significantly the least. Bifenazate, chlorfenapyr and spiromesifen, induced 100%, 88% and 88% mortality, respectively, 1 day after application. Meanwhile, they induced 65%, 46% and 50% mortality, respectively, 15 days after their application.

Residual effect of acaricides on *T. urticae* adult females of Deir- Alla population

Table (3) shows that bifenazate and chlorfenapyr induced 66% and 68% mortality of adult females of *T. urticae* for 15 days after application and they were not significantly different from each other. Bifenazate, chlorfenapyr and spiromesifen remained effective for several days longer than other acaricides with mortality that reached 95%, 87% and 85%, respectively, 6 days after treatment. Meanwhile, abamectin, amitraz and milbemectin induced 12%, 11% and 23% mortality, respectively, 6 days after application. However, Mortality percentages for bifenazate 1, 3 , 6, 9,12 and 15 days after applications were significantly the greatest compared to other acaricides. On the other hand mortality percentages for abamectin on all days after applications were significantly the least.

Table (3): Residual effects of six acaricides against *T.urticae* adult females of Deir Alla population

Acaricide	Concentration (mg /l)	% Mortality after days (d) or application± SE					
		1d	3d	6d	9d	12d	15d
Abamectin	7.2	19±1.0d	14±1.2e	12±0.0d	10±1.2e	8±1.6e	7±1.0d
Amitraz	500	18±1.2d	15±1.0e	11±1.0d	10±1.2e	8±1.6e	7±1.0d
Bifenazate	96	100±0.0a	100±0.0a	95±2.2a	90±1.2a	79±1.9a	68±1.6a
Chlorfenapyr	120	96±1.6b	92±1.6b	87±1.9b	79±3.0b	72±1.6b	66±1.2a
Millbemectin	12.5	33±1.9c	28±2.3d	23±1.9c	17±1.0d	13±1.0d	10±1.2c
Spiromesifen	180	92±1.6b	88±1.6c	85±1.9b	71±1.9c	64±1.6c	52±1.6b
Control	Tap Water	4±1.6e	4±0.0f	5±1.0e	4±0.0f	5±1.0e	4±0.0e

Means within the same column with the same letter are not significantly different after arcsine transformation using LSD at 0.05.

Table (4): Residual effects of six acaricides against *T. urticae* adult females of Karamah population

Acaricide	Concentration (mg /l)	% Mortality after days (d) or application± SE					
		1d	3d	6d	9d	12d	15d
Abamectin	7.2	21±1.0d	18±1.2d	17±1.0d	15±1.0d	12±1.6c	10±1.2d
Amitraz	500	25±1.0d	20±1.6d	18±1.2d	12±1.6d	10±1.2c	9±1.0d
Bifenazate	96	100±0.0a	98±1.2a	92±1.6a	83±1.9a	72±1.6a	68±1.6a
Chlorfenapyr	120	75±1.0c	63±1.0c	51±1.0c	46±2.6c	41±1.9b	36±1.6c
Millbemectin	12.5	28±1.6d	20±1.6d	15±1.0d	12±1.6d	10±1.2c	9±1.0d
Spiromesifen	180	91±1.0b	86±1.2b	80±1.6b	72±1.6b	67±1.9a	56±1.6b
Control	Tap Water	4±1.6e	4±0.0e	5±1.0e	4±0.0e	5±1.0d	4±0.0e

Means within the same column with the same letter are not significantly different after arcsine transformation using LSD at 0.05.

Residual effect of acaricides on *T. urticae* adult females of Karamah population

Residual effects of tested acaricides against *T. urticae* females collected from Karamah region as shown in Table (4).

Bifenazate, chlorfenapyr and spiromesifen induced 100%, 75% and 91% mortality, respectively 1 day after application. Meanwhile, they induced 68%, 36% and 56% mortality, respectively 15 days after application. On the other hand, abamectin, amitraz and milbemectin induced 21%, 35% and 28% mortality, respectively 1 day after application.

Meanwhile, they induced 10%, 9% and 9% mortality 15 days after application with no significant differences between their mortalities at 1, 3, 6, 9, 12 and 15 days after application.

Residual effect of acaricides on *T. urticae* adult females of Syrian Susceptible Strain

Table (5) shows comparative residual effects of abamectin, amitraz, bifenazate, chlorfenapyr, milbemectin, and spiromesifen when used at their higher recommended application rates against the SSS strain. Bifenazate maintained at least 89.0% mortality of adult *T.*

urticae, followed by chlorfenapyr and spiromesifen (63%), milbemectin (52%), abamectin (51%), and amitraz (37%) for 15 days after application. Mortality

percentages of the tested acaricides against the SSS strain 6 days after treatment were as follows: 98% for bifenazate, 90% for spiromesifen, 86% for chlorfenapyr, 85% for abamectin, 82% for milbemectin and 70% for amitraz. It was revealed that the SSS strain was susceptible to all tested acaricides when used at their higher recommended rate. However, Mortality percentages for bifenazate 1, 3 , 6, 9,12 and 15 days after applications were significantly the greatest compared to other acaricides. On the other hand mortality percentages for abamectin on all days after applications were significantly the least.

DISCUSSION

Results showed that abamectin, amitraz and milbemectin had very low residual effect on all the *T.urticae* field populations, while they were active against the SSS. These results ensure the fact that the *T.urticae* field populations developed resistance against these chemicals. Al-Antary *et al.* (2012a) reported that amitraz was ineffective in controlling *T.urticae*, while bifenazate with high efficacy(Al-Antary *et al* 2012b).The highest mortality percentage among the field populations of TSSM was 33% for milbemectin followed by 24% for both abamectin and amitraz after 24 hours of application, while against the susceptible strain milbemectin caused 97% mortality followed by abamectin and amitraz, 24 hours after application. After 15 days of acaricides application, the lowest mortality percentages caused by abamectin, milbemectin and amitraz against the *T.urticae* field populations decreased to reach 7% meanwhile, against the SSS the mortality percentage reached 52% for milbemectin, followed by abamectin and amitraz. The residual effect of bifenazate, spiromesifen and chlorfenapyr acaricides against the field populations of *T.urticae* was very high and the mortality percentage was 100% for bifenazate and the least 75%-98% for chlorfenapyr 24 hours after application. These results agreed with the fact that these acaricides are relatively new products, and belong to different chemical groups with different modes of action.

In Japan, Ochiai *et al*. (2007) studied the toxicity of bifenazate against the *T.urticae* and concluded that bifenazate is a novel acaricide with high toxicity to all life stages of *T. urticae*. They added that there were no cross-resistance between bifenazate and other classes of acaricides, such as etoxazole, dicofol and spiromesifen. They also concluded that bifenazate remained effective for long time with only 10% loss of efficacy on *T. urticae* after one month of application on apple trees.

Marcic *et al.* (2009) from Serbia concluded that spiromesifen considerably affected the fecundity and population growth rate of *T.urticae* treated females. The females treated with 180 ppm laid no eggs and most died within a few days. These results agreed with the residual effect results obtained in the present study. However spiromesifen showed good residual effect, but some populations showed resistance to its toxicity. In contrast bifenazate showed excellent toxicity and residual effect against all the tested populations.

Laboratory tests of six acaricides; abamectin, amitraz, bifenazate, chlorfenapyr, milbemectin, and spiromesifen against three cucumber field populations of the two-spotted spider mite, collected from , Krimeh, Deir-Alla, and Karamah in the central Jordan vally as well as SSS strain revealed the following conclusions: At its high recommended field rate abamectin was ineffective in controlling *T. urticae*. It had no residual effect except against the SSS strain. Amitraz was ineffective in controlling the *T.urticae* at the same time it showed very low residual effect against the tested populations except the SSS strain. The tested field populations were moderately resistant to milbemectin. Abamectin had weak residual effect against *T. urticae* when used at its high recommended field rate . Bifenazate was a very useful acaricide giving a high efficacy, long lasting effect against *T. urticae* even when it was used with concentrations less than its recommended application rate. In contrast to toxicity effect spiromesifen was an effective acaricide since it had a good residual effect. Chlorfenapyr was active in controlling adult females of *T.urticae* when it was used at its recommended rate, as well as it had long residual effect. In Jordan, Nazer (1982,1985) tested several organophosphate and carbamate pesticides against *T.*urticae collected from several areas in Jordan valley. He found that these pestecides had weak residual effect on *T.urticae* due to the gained resistance for most common acaricides in the previous century at different levels. Several workers (Goodell *et al.* 2001, Zhang 2003, Kim *et al*. 2007, Ghadamyari and Sendi 2008) reported the acaricides management on *T.urticae* on several crops in different

parts of the world.

However, in order to have safe and high quality and quantity of cucumber product and to manage resistance development by *T .urticae* to acaricides, the following are recommended. Regular monitoring should be carried out to detect the extent of resistance to the pesticides used. Restricting the use of acaricides to which the magnitude of resistance is high like abamectin and amitraz. Applying acaricides that have different active ingredients and different mode of action like bifenazate, spiromesifen and chlorfenapyr. Training of growers on alteration of acaricides based on mode of action to facilitate long term sustainable spider mite management. Adoption of a mode of action labeling scheme of pesticides that were registered and for these which will be registered in future by Ministry of Agriculture in Jordan. In addition studying the mechanisms of resistance to acaricides is very important to prevent cross resistance between closely related groups.

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REFERENCES

Al Antary, T. M., Al- Lala, M.R. K. and Abed-Wali, M. 2012a. Response of seven populations of the two-spotted spider mite (*Tetranychus urticae* Koch) for amitraz acaricide on cucumber (*Cucumis sativus* L.) under plastic houses in Jordan. Advances in Environmental Biology (AEB) 6 (3) 951-954.

Al Antary, T. M., Al-Lala, M .R. K. and Abed-Wali, M. 2012b. Response of seven populations of the two-spotted spider mite (*Tetranychus urticae* Koch) for bifenezate acaricide on cucumber (*Cucumis sativus* L.) under plastic houses in Jordan. Advances in Environmental Biology (AEB), 6 (7): 2203-2207.

Al-Mommany, A. and Al-Antary, T. 2008. Pests of Home and Garden, (2nd. ed.), Publication of the Deanship of research at University of Jordan, Amman, 512.

El Kady, G. A., El-Sharabasy, H. M., Mahmoud, M. F. and Bahgat, I. M. 2007. Toxicity of two potential bio-insecticides against moveable stages of *Tetranychus urticae* Koch. *Journal of Applied Science Research*, 3 (11): 1315-1319.

Ghadamyari, M. and Sendi, J. 2008. Resistance mechanisms to oxydemeton- methyl in *Tetranychus urticae* Koch (Acari: Tetranychidae). Research Report, Dept. Plant Protection, Collage of Agriculture, University of Guilan, Rasht, Iran, 5: 97-102.

IRAC, Insecticide Resistance Action Committee. 2010. MoA Classification Scheme . September: Version 7. www.irac-online.org.

Kim, Y., Lee, S. Cho, J., Park , H. and Ahn, Y. 2007. Multiple resistance and biochemical mechanisms of dicofol resistance in *Tetranychus urticae* Koch (Acari: Tetranychidae). *Journal of Asia Bacific Entomology*, 10 (2):165-170.

Koh, S.H., Ahn, Y.J., Im, J-S., Jung, C., Lee, S. H. and Lee, J.H. 2009. Monitoring of acaricide resistance of *Tetranychus urticae* (Acari: Tetranychidae) from Korean apple orchards. *Journal of Asia Pacific Entomology*, 12: 15-21.

Little, T. and Hills, F. 1972. Transformations in Statistical Methods in Agricultural Research. University of California, 103-119.

Marcic, D., Ogurlic, I., Mutavdzic, S. and Peric, P. 2009. The effect of spiromesifen on the reproductive potential of *Tetranychus urticae* Koch (Acari: Tetranychidae). *Pestic. Phytomed.*

Ministry of Agriculture. 2009. *Annual Agricultural Statistics*. The Hashemite Kingdom of Jordan, Amman, Jordan.

Nazer, I. K. 1982. Susceptibility of the spider mite(*Tetranychus urticae* Koch.) to certain acaricides. *Dirasat*, 9: 71-77.

Nazer, I. K., (1985), Response of the two-spotted spider mite (*Tetranychus urticae* Koch.), collected from the Jordan Valley, to certain acaricides. *Dirasat*, 12: 143-150.

Ochiai, N., Mizuno, M., Miyake, N., T., Dekeyser, M., Canlas L. J. and Takeda, M. 2007. Toxicity of bifenazate and its principal active metabolite, diazene, to *Tetranychus urticae* and *Panonychus citri* and their relative toxicity to the predaceous mites, *Phytoseiulus persimilis* and *Neoseiulus californicus. Exp.*

Appl.Acarol., 43: 181-197.

Ramasubramanian, T., Ramaraju, K. and Regupathy, A. 2005. Acaricide resistance in *Tetranychus urticae* Koch (Acari: Tetranychidae) Global Scenario. *Journal of Entomology*, 2 (1): 33-39.

SAS Institute . 2002. *SAS version 9.0* Cary, NC.

Tomlin, C. D. 2005. *The Electronic Pesticide Manual*, (13th. ed.). Crop Protection Publications. British Crop Protection Council. Farnham, Surrey, UK.

Tsagkarakou, A., Navajas M., Lagnel, J., Gutierrez, J. and Pasteur, N. 1996. Genetic variability in *Tetranychus urticae* (Acari: Tetranychidae) from Greece: insecticide resistance and isozymes. *Entomological Society of America*, 1345-1358.

Van den Boom C. E. M., Van Beek, T. A. and Dicke, M. 2003. Differences among plant species in acceptance by the spider mite *Tetranychus urticae* Koch, *Journal of Applied Entomology*, 127: 177-183.

Whalon, M., Mota-Sanchez, D. and Hollingworth, R. 2008. Global Peesticide Resistance in Arthropods. CABI Wallingford, UK, p.166.

Zhang, Z. Q. 2003. Mites of Greenhouses: Identification, Biology and Control. CABI Publishing, Wallingford, UK, xii+ p.244.

فعالية الأثر المتبقي لستة مبيدات حلم على الحلم الأحمر ذي البقعتين (Tetranychus *urticae* Kosh) (Acari: Tetranychidae) على محصول الخيار تحت ظروف البيوت البلاستيكية في وادي الأردن الأوسط

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ملخص

نفذت اختبارات تقييم حيوية في المختبر خلال الفترة من حزيران 2009 إلى آب 2010 لدراسة الأثر المتبقي للمبيدات الأكثر استعمالا لمكافحة الحلم الأحمر ذي البقعتين، وهي الأبامكتين والأميتراز والبايفينزيت والكلورفينابير والميلبيماكتين والسبيرومسفين ضد أربعة مجتمعات من الحلم الأحمر ذي البقعتين (T.urticae) جمعت من مناطق زراعة محصول الخيار تحت البيوت البلاستيكية في الأغوار الوسطى وهي: الكريمة ودير علا والكرامة، وقد أحضرت السلالة الرابعة من مركز تربية الأعداء الحيوية باللاذقية في سوريا واعتبرت السلالة الحساسة.

لقد استمر تأثير مبيدات البايفينزيت (83%–94%) والكلورفينابير (46%–76%) والسبيرومسفين (72%–81%) ضد إناث الحلم البالغة لجميع المجتمعات المستخدمة تسعة أيام، وبنسبة قتل بلغت 89% و76% و70% على التوالي وذلك عند استخدام المعدل الأعلى الموصى به لكل من المبيدات المذكورة المجربة. لم يكن لمبيدات الابامكتين والاميتراز والميلبيماكتين أثر فعال طويل المدى ضد مجتمعات الحلم الأحمر ذي البقعتين المستخدمة، بينما كان لها تأثير جيد ضد السلالة السورية الحساسة بنسب قتل بلغت 76% و61% و71% على التوالي. وقد أظهرت نتائج هذه الدراسة أيضا بأن المجتمعات الستة المجربة لديها مقاومة لكل من مبيدات الأبامكتين والاميترازو الكلورفينابير والمليبماكتين السبيرومسفين بينما لم يكن لديها مقاومة ضد مبيد البايفينزيت.

توصي نتائج الدراسة باستخدام مبيدات البايفينزيت والكلورفينابير والسبيروميسفين أو أي مبيدات حلم مسجلة أخرى في وزارة الزراعة الأردنية بالتبادل مع مبيدات الميلامكتين والاميتراز للمحافظة على فعالية تلك المبيدات وتجنب أو التقليل من مقاومة الحلم الأحمر ذو البقعتين لهذه المبيدات.

الكلمات الدالة: Tetranychus urticae، مبيدات حلم، الحلم الأحمر ذي البقعتين، فعالية الأثر المتبقي، وادي الأردن الأوسط، الخيار، الأردن.

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